

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference RJB/P470003WO	FOR FURTHER ACTION <small>see Form PCT/ISA/220 as well as, where applicable, item 5 below.</small>	
International application No. PCT/EP2004/003293	International filing date (day/month/year) 29/03/2004	(Earliest) Priority Date (day/month/year) 27/03/2003
Applicant TOROTRAK (DEVELOPMENT) LIMITED		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 5 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Basis of the report

a. With regard to the **language**, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.

2. ☐ **Certain claims were found unsearchable** (See Box II).

3. ☐ **Unity of invention is lacking** (see Box III).

4. With regard to the **title**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the **abstract**,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regards to the **drawings**,

a. the figure of the **drawings** to be published with the abstract is Figure No. 3

☒ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/EP2004/003293

Re Item V.

Reference is made to the following documents:

D1: US-A-5 521 819

D2: EP-A-0 925 992

D3: WO-A-90/05860

- 1.a. D1 discloses a method of controlling a continuously variable ratio transmission of the type comprising a continuously variable ratio unit, a variator, which has a rotary input and output members through which the variator is coupled between an engine and a driven component, the variator receiving a primary control signal and being constructed and arranged such as to exert upon its input and output members torques which, for a given ratio, correspond directly to the control signal. The method of D1 comprises the determining of an operator demand for a higher engine speed, that is, establishes a measure for what could be referred to as a target engine acceleration. D1 also states that its control method can be used in a transmission of the type disclosed in WO-A-90/05860 (referred to in the application as EP-A-0 444 086).

The subject matter of claim 1 differs from the above in that the method comprises the determining of the variator's primary control signal and engine torque for providing the wanted acceleration, the adjusting of the transmission and / or engine torque accordingly, the predicting of a consequent engine speed change, and the correcting of transmission control signal and engine torque based on actual and predicted speeds.

The subject matter of claim 17 differs in that the method comprises the determining of the excess torque required to accelerate the power train inertia to achieve the wanted acceleration, and the adjusting of the transmission and / or engine torque such that engine torque is equal to loading torque applied by the transmission to the engine plus the excess torque.

It is generally known in the art, to control a continuously variable transmission and an engine conjointly while taking into account the inertia torque caused when accelerating the power train of the vehicle equipped with such an arrangement.

The document D2, for example, illustrates this concept. Since it is described in document D2 as providing the same advantages as in the present application, the

skilled person would therefore regard it as a normal option to include this feature in the control method described in document D1, to thus arrive at the subject matter claimed in claim 17. The resulting method would also have the features of claim 1.

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 and 17 does not involve an inventive step in the sense of Article 33(3) PCT.

- 1.b. D2 can be seen to disclose a method having the features of claim 29. It is known to the person skilled in the art that a continuously variable transmission when controlling its ratio can be regarded as controlling the engine loading torque. D1 explicitly discloses the method of controlling a continuously variable transmission such as to exert upon its input and output members torques which, for a given ratio, correspond directly to the control signal. The subject matter of claim 29 is therefore at least obvious in the light of the combined teachings of D1 and D2.

The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claim 29 lacks novelty and/or does not involve an inventive step in the sense of Articles 33(2) and/or 33(3) PCT.

- 1.c. In the light of the objection made in paragraph 1.c., a method of controlling engine speed having the features of claim 38 is obvious. The subject-matter of claim 38 does not involve an inventive step in the sense of Article 33(3) PCT.
- 1.d. A device according to claim 42 is at least implied in D2 (see paragraph 1.c.) or obvious in the light of the combined teachings of D1 and D2. The subject-matter of claim 42 lacks novelty and/or does not involve an inventive step in the sense of Articles 33(2) and/or 33(3) PCT.
2. The additional features of the claims 2 - 16 and 43, 18 - 28 and 30 - 37, 39 - 41 are either already known from D1 and/or D2, or are at least obvious in the light of the teachings of these documents and general common technical knowledge (see for example D3). The subject-matter of these claims 2 - 16 and 43, 18 - 28 and 30 - 42 does not involve an inventive step in the sense of Article 33(3) PCT.

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/003293

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60K41/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B60K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5 521 819 A (GREENWOOD CHRISTOPHER J) 28 May 1996 (1996-05-28) claim 1	1-43
Y	EP 0 925 992 A (NISSAN MOTOR) 30 June 1999 (1999-06-30) paragraph '0067! - paragraph '0091! figure 4	1-43
A	US 2001/010029 A1 (HATTORI YUJI ET AL) 26 July 2001 (2001-07-26) paragraph '0010! paragraph '0052! - paragraph '0054! paragraph '0056! - paragraph '0060! figure 2	1,8-11, 17-21,29
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

T later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

Y document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

G document member of the same patent family

Date of the actual completion of the international search

24 June 2004

Date of mailing of the international search report

30/06/2004

Name and mailing address of the ISA

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Authorized officer

Van Prooijen, T

INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/003293

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 90/05860 A (TOROTRAK DEV LTD) 31 May 1990 (1990-05-31) the whole document & EP 0 444 086 A 4 September 1991 (1991-09-04) cited in the application -----	1,5-7, 17,29, 38,42

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003293

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5521819	A	28-05-1996	DE 69308552 D1	10-04-1997
			DE 69308552 T2	02-10-1997
			EP 0643648 A1	22-03-1995
			GB 2280005 A ,B	18-01-1995
			JP 7505699 T	22-06-1995
			ES 2099431 T3	16-05-1997
			WO 9321031 A1	28-10-1993
EP 0925992	A	30-06-1999	EP 0925992 A2	30-06-1999
			JP 11263151 A	28-09-1999
			US 6272414 B1	07-08-2001
US 2001010029	A1	26-07-2001	JP 2001206106 A	31-07-2001
			JP 2001328463 A	27-11-2001
			DE 10103133 A1	09-08-2001
			FR 2804071 A1	27-07-2001
WO 9005860	A	31-05-1990	AT 84602 T	15-01-1993
			AU 631386 B2	26-11-1992
			AU 4620889 A	12-06-1990
			BR 8907774 A	13-08-1991
			CA 2003334 A1	21-05-1990
			DD 297864 A5	23-01-1992
			DE 68904434 D1	25-02-1993
			DE 68904434 T2	06-05-1993
			EP 0444086 A1	04-09-1991
			ES 2037478 T3	16-06-1993
			WO 9005860 A1	31-05-1990
			GB 2227287 A ,B	25-07-1990
			HU 63234 A2	28-07-1993
			IN 176702 A1	24-08-1996
			JP 2646040 B2	25-08-1997
			JP 4502954 T	28-05-1992
			KR 137405 B1	24-04-1998
			PL 165076 B1	30-11-1994
			RU 2004863 C1	15-12-1993
			US 5423727 A	13-06-1995
			US 5395292 A	07-03-1995
			CA 2008770 A1	30-07-1990
EP 0444086	A	04-09-1991	AT 84602 T	15-01-1993
			AU 631386 B2	26-11-1992
			AU 4620889 A	12-06-1990
			BR 8907774 A	13-08-1991
			CA 2003334 A1	21-05-1990
			DD 297864 A5	23-01-1992
			DE 68904434 D1	25-02-1993
			DE 68904434 T2	06-05-1993
			EP 0444086 A1	04-09-1991
			ES 2037478 T3	16-06-1993
			WO 9005860 A1	31-05-1990
			GB 2227287 A ,B	25-07-1990
			HU 63234 A2	28-07-1993
			IN 176702 A1	24-08-1996
			JP 2646040 B2	25-08-1997
			JP 4502954 T	28-05-1992
			KR 137405 B1	24-04-1998
			PL 165076 B1	30-11-1994

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/003293

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0444086	A	RU 2004863 C1	15-12-1993
		US 5423727 A	13-06-1995
		US 5395292 A	07-03-1995
		CA 2008770 A1	30-07-1990
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PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY
(PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/EP2004/003293

International filing date (day/month/year)
29.03.2004

Priority date (day/month/year)
27.03.2003

International Patent Classification (IPC) or both national classification and IPC
B60K41/14

Applicant
TOROTRAK (DEVELOPMENT) LIMITED

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

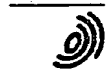
If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**International application No.
PCT/EP2004/003293

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
☐ a sequence listing
☐ table(s) related to the sequence listing
 - b. format of material:
☐ in written format
☐ in computer readable form
 - c. time of filing/furnishing:
☐ contained in the international application as filed.
☐ filed together with the international application in computer readable form.
☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/EP2004/003293

Box No. II Priority

1. ☒ The following document has not been furnished:

☒ copy of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(a)).

☐ translation of the earlier application whose priority has been claimed (Rule 43*bis*.1 and 66.7(b)).

Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.

2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.

3. Additional observations, if necessary:

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-28,30-41,43
	No: Claims	29,42
Inventive step (IS)	Yes: Claims	
	No: Claims	1-43
Industrial applicability (IA)	Yes: Claims	1-43
	No: Claims	

2. Citations and explanations

see separate sheet